School and daycare exclusion policies for chickenpox: A rational approach

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In many locales, school and daycare policies require children with chickenpox to stay home until the rash has crusted over or cleared. In 1994, the Canadian Paediatric Society (CPS), as part of the statement “Chickenpox: Prevention and treatment”, recommended exclusion only while the child is so ill as to require more care than can be provided by school or daycare personnel [1]. The CPS recommended that children with mild illness be permitted to return to daycare or school as soon as they feel well enough to participate normally in all activities, regardless of the state of the rash.

In contrast, the American Public Health Association recommends exclusion until at least five days after the eruption first appears [2]. The American Academy of Pediatrics, in both the 1994 and 1997 Reports of the Committee on Infectious Diseases, agrees with this stricter exclusion policy, but tempers this recommendation by stating that “in mild cases with only a few lesions and rapid resolution, children may return sooner if all lesions are crusted” [3][4].

Because the data and rationale to support the more permissive policies of the CPS and the American Academy of Pediatrics are not included in the statements [1][4], practitioners and public health officials have often been reluctant to shift from the more strict exclusion criteria, even if the child is well. This enforced five-day absence for an otherwise healthy active child with very mild illness can be costly to families who may be forced to find alternative care arrangements if both parents are working.

The purpose of this statement is to review the data and rationale for supporting a less strict school and daycare policy for children with mild chickenpox.

Humans are the only known reservoir for the varicella-zoster virus (VZV), the cause of chickenpox. This is a very common childhood infection that is quite contagious even in the school setting. In a 1950 report by Wells and Holla [5], 61 of 67 susceptible children in kindergarten through the fourth grade contracted chickenpox in a school-based outbreak. The incubation period of chickenpox is generally regarded as 14 to 16 days, but may occur as early as 10 days or as late as 21 days after contact [6][7].

Evidence from epidemiology reports about the acquisition of chickenpox from patient contact 24 h and possibly up to 96 h before the development of the rash [8][9][9], and reports of hospital outbreaks of chickenpox where only the airborne rate of transmission was possible [10][11], supports the assumption that VZV is contracted by the respiratory route and that it replicates in the nasopharynx or upper respiratory tract. Unfortunately, while VZV can be isolated from vesicular fluid obtained within the first three days of the rash, it has not been grown frequently in tissue culture of nasopharyngeal secretions either just before or after the onset of the rash [12]. This is most likely due to the insensitivity of culture methods. More recently, however, application of the more sensitive polymerase chain reaction method has readily detected VZV DNA in nasopharyngeal secretions of exposed individuals on the day before the rash, with the highest quantity of VZV DNA in the throat being detected on day one of the rash [13]. These data provide support for the respiratory route transmission hypothesis. Furthermore, Asano et al [14] have also shown a direct and strong correlation between the severity of viremia and clinical findings in children with chickenpox. Higher viremia is associated with higher temperatures, more prolonged fever and more vesicles. Thus, exclusion of children too ill to participate fully in activities will likely exclude symptomatic children with the highest viremia.
Thus, both the epidemiology and the polymerase chain reaction virology data indicate that exclusion of children from school or daycare for five days once the chickenpox rash has developed and been recognized is too late to prevent VZV exposure of their fellow classmates. There are no data to show that an exclusion policy that starts once chickenpox is diagnosed slows down the spread of chickenpox within a school or daycare centre. A study by Moore and Hopkins in 1991 evaluated the effectiveness of a seven day from the onset of rash exclusion policy for chickenpox in two Ohio schools [15]. Using person-time analysis, the authors determined that classmates of children with chickenpox were 3.6 times more likely to become a case 12 to 17 days (one incubation period) after the last day that the index children were in class than at any other time [15]. Unlike the experience of households, subsequent cases were not more severe. Transmission was greatest in the prodrome period (ie, the day before onset of the rash). No transmissions were documented after the children returned to school, even though 15 returned after less than five days from onset of the rash.

Chickenpox epidemiology studies in hospitals provide further evidence that school exclusion policies after the onset of rash are inadequate to prevent transmission. Hospitals, when dealing with a child exposed to chickenpox, place the child in isolation from day eight until day 21 after the known VZV contact, to prevent other children on the ward from being exposed to VZV in the days before the exposed child develops the overt rash [4]. Such rigid and very prolonged isolation procedures are required in hospital to minimize the spread of VZV. Where this has not been done and isolation has only been started after onset of the rash, prolonged hospital chickenpox outbreaks have occurred [6]. This type of two-week exclusion policy starting eight days after contact (two days before the shortest incubation period) while awaiting VZV disease onset is not practical or feasible for schools or daycare centres to implement.

Based on these data, the CPS recommends the following.

• A child with mild illness should be allowed to return to school or daycare as soon as he or she is well enough to participate normally in all activities, regardless of the state of the rash. Parents, particularly parents of immunosuppressed children, should be notified that chickenpox is in the class as well as be provided with information on the VZV incubation period and how to detect early VZV.
• Public health jurisdictions should review their policies.
• Hospitals should continue their rigid and prolonged isolation precautions (day eight to day 21 from contact) for all hospitalized nonimmune exposed patients and exclusion of nonimmune visitors in order to minimize nosocomial spread.

In the United States, varicella vaccine use has led to a decrease in varicella in child care centre attendees (16) and, thus, has made chickenpox exclusion policy issues less relevant. When varicella vaccine becomes widely available and widely used in Canada, chickenpox cases in schools and child care centres should decrease, and exclusion policy issues will become less of a concern.

References

5. Wells MW, Holla WA. Ventilation in the flow of measles and chickenpox through a community. JAMA 1950;142:1337-44.


Addendum
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The recommendations in this statement are unchanged as of 2007. For more up-to-date information about the varicella vaccine, consult the Canadian Paediatric Society position statement, Preventing varicella: Recommendations for routine two-dose varicella immunization in children.

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